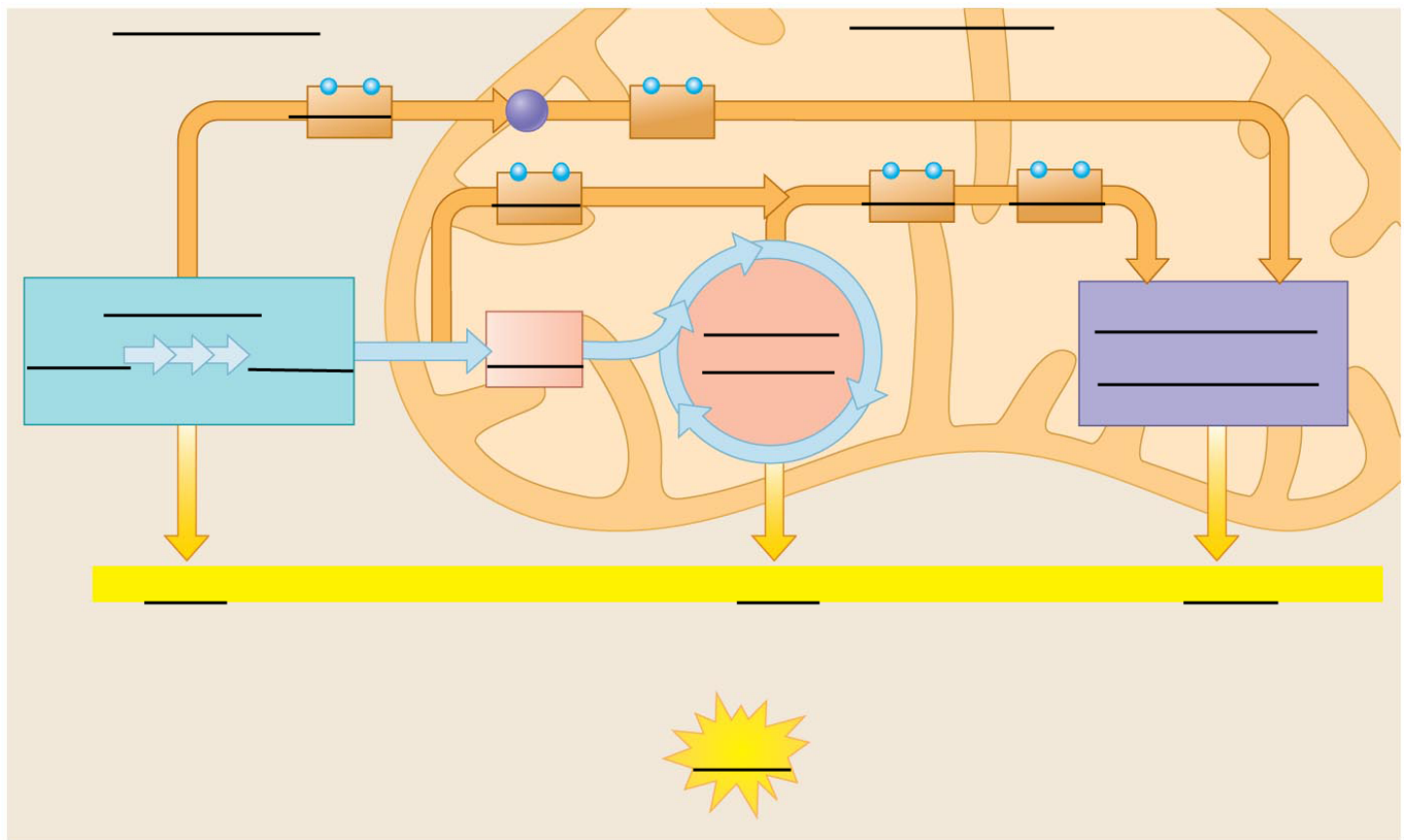


Chapter 6A-How Cells Harvest Chemical Energy: Cellular Respiration & Glycolysis

The below figure introduces the 3 stages of cellular respiration. Label the diagram. Include **electron transport chain**, **pyruvate**, **mitochondrion**, **citric acid cycle**, **glycolysis**, **cytoplasm**, **glucose**, **2 NADH**, **6 NADH**, **2 FADH₂**, **2 ATP**, **34 ATP**, **38 ATP**.



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Glycolysis is the first of 3 steps in cellular respiration. Review glycolysis by matching each phrase on the left with a term on the right. Some terms are used twice.

- | | |
|--------------------------------------------------------------------|---------------------|
| _____ 1. Compound formed as glucose is changed to pyruvic acid. | A. NADH |
| _____ 2. Fuel molecule broken down in glycolysis | B. Pyruvate |
| _____ 3. Produced by the electron transport chain | C. ATP |
| _____ 4. Invested to energize glucose molecule at start of process | D. NAD ⁺ |
| _____ 5. Substance that is reduced as glucose is oxidized | E. Glucose |
| _____ 6. Glucose is converted to two molecules of this | F. Glycolysis |
| _____ 7. "Splitting of sugar" | H. Oxygen |
| _____ 8. Carries hydrogen and electrons from oxidation of glucose | |

9. Consider the following equation:



The molecule glucose is (oxidized or reduced) a. _____, while oxygen is (oxidized or reduced) b. _____. This is an (endergonic or exergonic) c. _____ reaction, and is used by cells to build up ATP.

10. Define each of the following:

- a. Oxidation _____

- b. Reduction _____

11. What is the role of NAD⁺ & FAD⁺² in cellular respiration? _____

12. Glycolysis starts with _____ and produces _____

13. Write the summary equation for cellular respiration:

- _____
- a. Where did the glucose come from? _____
- b. Where did the O₂ come from? _____
- c. Where did the CO₂ come from? _____

- d. Where did the H_2O come from? _____
- e. Where did the ATP come from? _____

14. **STAGE 1: Glycolysis**

- a. Occurs where? _____
- b. Starts with? _____
- c. Produces? _____
- d. Yields how much ATP directly? _____
- e. Yields how much ATP indirectly through the electron transport chain? _____

15. Why is glycolysis thought to be one of the earliest of all biochemical processes to have evolved?

Select the best answer.

- _____ 16. In glycolysis, _____ is oxidized and _____ is reduced.
- | | |
|--------------------------|--------------------------|
| a. NAD^+ . . . glucose | b. glucose . . . oxygen |
| c. ATP . . . ADP | d. glucose . . . NAD^+ |
| e. ADP . . . ATP | |

- _____ 17. Which of the following describes glycolysis?
- a. It begins the oxidation of glucose
 - b. It produces a small amount of ATP
 - c. It generates NADH
 - d. It splits glucose to form two molecules of pyruvate
 - e. All of the above

- _____ 18. As a result of glycolysis there is a net gain of _____ ATPs.
- a. 2 b. 4 c. 36 d. 0 e. 1

- _____ 19. Which of the following is a result of glycolysis?
- a. production of CO_2
 - b. conversion of FAD_{2+} to $FADH_2$
 - c. conversion of NADH to NAD^+
 - d. a net loss of two ATPs per glucose molecule
 - e. conversion of glucose to two pyruvates